Multidisciplinary approach to Ewing sarcoma - combining chemotherapy, radiotherapy and hematopoetic stem cell transplantation: a case report.

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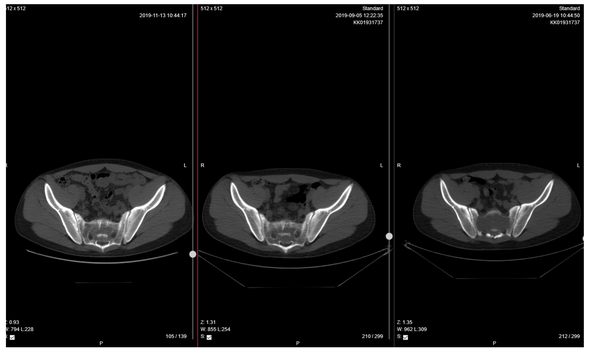
Introduction and Aim

Ewing sarcoma (ES) is aggressive form of round cell mesenchymal sarcomas commonly appearing in children and young adults. It is very rare disorder with annual incidence of 2,9 - 3 cases in 1 mln. Clinical presentation differs depending on the localization of the tumor. One quarter of patients diagnosed with ES already has a metastatic disease. On the other hand – subclinical metastases are presumed to be present in almost all patients. This is the reason of high relapse rate (80-90 percent) in patients who were treated only with local therapy. Combination of chemotherapy with multiple anticancer drugs and local treatment by surgery or/and radiotherapy (RT) are typical methods with curative intent. In addition to, high dose myeloablative chemotherapy followed by stem cell transplantation is thought to improve outcomes for high risk non- metastatic patients. About 65-75 percent of patients with localized ES who undergone treatment survives for 5 years. If disease is metastatic 5 year OS varies from less than 30 to 50 percent. We are presenting a case of multidisciplinary treatment of patient with localized Ewing sarcoma.

Case Report

In June of 2019, 20 years old patient with progressing paralysis in both legs and dysfunction of urogenital organs was admitted. Non-homogeneous heterogeneous mass compressing spinal canal of 7,5 x 4,1 cm in size in the sacrum were found in the CT and MRI. In performed CT and PET/CT no metastases were detected. There was no pathological activity in bone marrow in PET/CT so trepanobiopsy was not performed.

Biopsy confirmed Ewing sarcoma which was proved by EWSR1 (22q12) translocation. We started treatment with 5 months of neoadjuvant chemotherapy of vincristine, doxorubicin, cyclophosphamide alternating with ifosfamide, etoposide (VDC/IE), overall 9 cycles were realized. After 2 cycles of chemotherapy neurological and urogenital dysfunction started to decrease. After 6 cycles in PET/CT full metabolic response was detected. With intend of HSCT, mobilisation of stem cells was completed successfully after 7 cycles of chemotherapy. In the end of systemic treatment we performed a biopsy of persisted PET/CT negative masses in the sacrum - necrotic cells were detected and full pathological response was confirmed. Multidisciplinary team decided to chose RT as a local treatment, surgery was not feasible option in this case, RT (60 Gy) to sacrum was completed. In March of 2020 HSCT was performed (high dose melphalan and busulfan conditioning) with no major complications. In the end of this multidisciplinary treatment patient had no neurological deficiency. Three months after completing HSCT there are no signs of diseases recurrence.

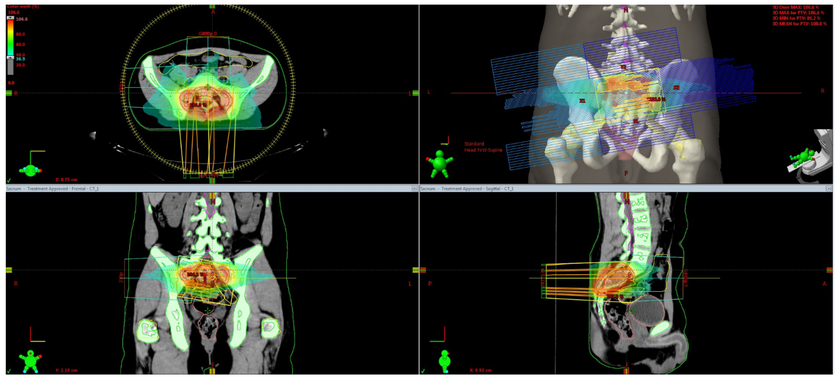


Dynamics of the tumor in the sacrum from the beginning (2019 June) to the end (2019 November) of chemotherapy VDC/IE.

Discussion

Even if Ewing sarcoma is localized micro metastases are presented in most of the cases. This is why ES is considered as a systemic disease. It has been known that local treatment alone for ES is not sufficient and systemic treatment is needed. EURO EWING 2012 trial which just ended in 2019, compared VIDE and VDC/IE induction regiments. Compelling results of this trial was revealed in ASCO 2020 annual meeting demonstrating that EFS and OS is better with VDC/IE with no excess toxicity. By treating our patient presented in this case report with the same regime we do expect the best outcomes as well.

In addition to, HSCT appears to be beneficial in improving overall survival in patients with localized Ewing's sarcoma. Although there is not one established treatment algorithm as the standard of care for localized ES and further trials are needed, we believe that bringing the chemotherapy, radiotherapy or surgery and HSCT therapy together could lead to best results in treating patients with this disease.



Plan of the radiotherapy to the sacrum, 60 Gy.

Conclusions

Combining chemotherapy, radiotherapy and hematopoetic stem cell transplantation in treatment of ES may be the one of the ways to achieve long term recurrence free and overall survival.

Key words

Ewing sarcoma, chemotherapy, radiotherapy, hematopoetic stem cell transplantation.

**In-text sources are known to the author*